

REMARKS

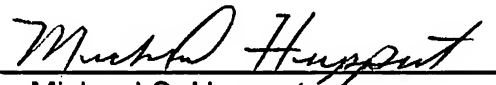
The present Preliminary Amendment is submitted to cancel claims 1-34 and add new claims 35-76. Note that the new claims are presented to delete the reference numerals in the original claims, and to remove the multiple dependencies in the original claims to thereby place such claims in condition for examination and reduce the required PTO filing fee.

Also, the specification and abstract have been reviewed and revised in order to make a number of minor editorial amendments and to remove the reference numerals from the abstract. Note that the changes to the abstract are submitted in the form of a substitute abstract.

Copies of the specification with changes marked therein is attached and entitled "Version with Markings to Show Changes Made."

Respectfully submitted,

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ABSTRACT

92 A bump is formed on each element electrode of a semiconductor device, and a thermoplastic resin sheet is aligned in position with the semiconductor device. The sheet and the semiconductor device are subjected to hot pressing to melt the sheet, forming a thermoplastic resin portion that covers a portion other than the end surface of each bump of the semiconductor device. The thermoplastic resin portion obtained after the hot pressing is cut.

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of a semiconductor device on a circuit pattern, which is electrically connected to the semiconductor device while being brought in contact with a bump of the semiconductor device and is formed of a conductive paste on a pattern forming surface of a base material, the apparatus comprising:

a semiconductor device pressurizing device for inserting the semiconductor device into the base material with the bump of the semiconductor device put in an exposed state or an unexposed state proximately to the pattern forming surface; and

a contact area increasing device for forming a contact area increasing portion for increasing a contact area of the circuit pattern with the bump on the bump exposed or located proximately to the pattern forming surface.

According to a ^{21st} [16th] aspect of the present invention, there is provided a semiconductor device-mounted component manufacturing apparatus as defined in the 25th aspect, wherein

the contact area increasing device comprises:

an extension portion-forming member for forming the contact area increasing portion by coming in contact with the bump or in contact with the pattern forming surface located in the vicinity of the bump; and

processes of a circuit pattern printing process of step S36
(process similar to step S31), a metallic particle mounting
process of step S37 (process similar to step S32), a paste
hardening process of step S38 (process similar to step S33),
5 a mounting process onto a sheet of step S39 (process
similar to step S34), and a hot pressing process of step
S40 (process similar to step S35), a circuit pattern is
formed of the conductive paste 12 on the end surface sides
of the metallic particles 11 exposed from the thermoplastic
10 resin portion 7c of the semiconductor package of Fig. 10A,
and the metallic particles 11 are mounted in the specified
positions of the circuit pattern. The conductive paste 12
is hardened, and after mounting a thermoplastic resin sheet,
hot pressing is performed to form another thermoplastic
15 resin portion 7d on the thermoplastic resin portion 7c.
With this arrangement, the multi-layered semiconductor
package shown in Fig. 10B can be produced. By repeating
the five processes of step S36 through S40 in required
times, a thermoplastic resin portion including the circuit
20 pattern and the metallic particles 11 can further be formed
in the number required on the thermoplastic resin portion
7d.

③ Even in this fourth embodiment, the semiconductor
device package, which has the total thickness of those of
25 the semiconductor device 3 and the thermoplastic resin

portion, can be remarkably reduced in thickness, dissimilar to the semiconductor device package shown in the prior art example of Fig. 21²¹[215]. Moreover, because of the absence of the conductive adhesive 16 and the encapsulant 21 shown in Fig. 21 and because of no time required for the hardening of the conductive adhesive and the encapsulant, the productivity can be remarkably improved. Furthermore, a multi-layered high-density semiconductor package can be supplied at low cost.

10 (Fifth Embodiment)

Fig. 12 is a partial sectional view for explaining the semiconductor device package of the fifth embodiment of the present invention. Fig. 13 is a process chart showing the semiconductor device package manufacturing method of the fifth embodiment.

As shown in Fig. 12, according to the semiconductor device package manufacturing method of the fifth embodiment, the semiconductor device package described in connection with the third embodiment has a structure in which a circuit pattern is formed of a conductive paste 12 on a thermoplastic resin portion 7 where the end surface 9 of each bump 4 is exposed, metallic particles 11 mounted on the circuit pattern are covered with a thermoplastic resin portion 7c, and the end surfaces of each metallic particles 11 are exposed on the surface of